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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
PYZOCHA, MICHAEL J

ART UNIT	PAPER NUMBER
2137	

DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/918,831	ROELSE, PETRUS LAMBERTUS ADRIANUS
	Examiner	Art Unit	
	Michael Pyzocha	2137	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _21 April 2005_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-10_ is/are pending in the application.

    4a) Of the above claim(s) _9 and 10_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-8_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 1-10 are pending.

2.   Amendment filed 04/21/2005 has been received and
considered.

Claim Objections

3.   The claim objections have been withdrawn based on the filed
amendments.

Election/Restrictions

4.   Newly submitted claims 9-10 directed to an invention that
is independent or distinct from the invention originally claimed
for the following reasons: Claims 1-8 relate to a system for
symmetric key encryption, classified in class 380 subclass 259;
while claims 9-10 relate to performing a particular algorithmic
function for encoding, classified in class 380 subclass 28. The
groups are related as subcombinations disclosed as usable
together in a single combination. The subcombinations are
distinct from each other if they are shown to be separately
usable. In the instant case, the invention of claims 9-10 has
separate utility such as encrypting data without the specific
matrix of claims 1-8. See MPEP § 806.05(d).

5.   Because these inventions are distinct for the reasons given

above, would require a different search and have acquired a

separate status in the art as shown by their different

classification, restriction for examination purposes as

indicated is proper.

Since applicant has received an action on the merits for

the originally presented invention, this invention has been

constructively elected by original presentation for prosecution

on the merits. Accordingly, claims 9-10 are withdrawn from

consideration as being directed to a non-elected invention. See

37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 101

6.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine,
> manufacture, or composition of matter, or any new and useful improvement
> thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

Claims 1-6 are rejected under 35 U.S.C. 101 because the

claimed invention is directed to non-statutory subject matter.

The language of claims 1-6 raises a question as to whether

the claim is directed merely to an abstract idea that is not

tied to a technological art, environment or machine which would

result in a practical application producing a concrete, useful,

and tangible result to form the basis of statutory subject

matter under 35 U.S.C. 101.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which

forms the basis for all obviousness rejections set forth in this

Office action:

> (a) A patent may not be obtained though the invention is not identically
> disclosed or described as set forth in section 102 of this title, if the
> differences between the subject matter sought to be patented and the prior
> art are such that the subject matter as a whole would have been obvious at
> the time the invention was made to a person having ordinary skill in the
> art to which said subject matter pertains. Patentability shall not be
> negatived by the manner in which the invention was made.

8.   Claims 1, 3-4, 7-8 are rejected under 35 U.S.C. 103(a) as

being unpatentable over Rijmen et al (The Cipher SHARK) and

further in view of Loureiro et al (Function Hiding Based on

Error Correcting Codes).

As per claims 1 and 7, Rijmen et al discloses a method of

generating a linear transformation matrix A for use in a

symmetric-key cipher, the method including: generating a binary

(n,k,d) error-correcting code, represented by a generator matrix

$\mathbf{G} \in Z_2^{kxn}$ in a standard form $\mathbf{G} = (I_k \| B)$, with $B \in Z_2^{kx(n-k)}$, where $k < n < 2k$,

and d is the minimum distance of the binary error-correcting

code (see page 4), and forming a nonsingular matrix with $2k-n$

columns (see page 5).

Rijmen et al fails to disclose extending matrix B, and deriving a matrix A from matrix C.

However, Loureiro et al teaches such an extension and derivation (see section 4.1).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Loureiro et al's extending and deriving in Rijmen et al's ciphering method.

Motivation to do so would have been to hide a function represented on a matrix format.

As per claim 3, the modified Rijmen et al and Loureiro et al method discloses the step of deriving matrix A from matrix C includes: determining two permutation matrices $P_1, P_2 \in Z_2^{k \times k}$ such that all codewords in an $[2k,k,d]$ error-correcting code, represented by the generator matrix $(I \| P_1 C P_2)$, have a predetermined multi-bit weight; and using $P_1 C P_2$ as matrix A (see Rijmen et al page 5 and Loureiro et al section 4.1).

As per claim 4, the modified Rijmen et al and Loureiro et al method discloses the cipher includes a round function with an S-box layer with S-boxes operating on m-bit sub-blocks, and the minimum predetermined multi-bit weight over all non-zero code words equals a predetermined m-bit weight (see Rijmen et al pages 5-6).

As per claim 8, the modified Rijmen et al and Loureiro et al method discloses a system for cryptographically converting an input data block into an output data block; the data blocks comprising n data bits; the system including: an input for receiving the input data block; a storage for storing a linear transformation matrix A, generated according to the method of claim 1, a cryptographic processor performing a linear transformation on the input data block or a derivative of the input data block using the linear transformation matrix A; and an output for outputting the processed input data block (see Rijmen et al as applied to claim 1 and Loureiro et al section 4.1).

1.   Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Rijmen et al and Loureiro et al method as applied to claim 1 above, and further in view of FOLDOC.

As per claim 2, the modified Rijmen et al and Loureiro et al method discloses the step of extending matrix B with $2k-n$ columns includes randomly generating $2k-n$ columns, each with k binary elements, and forming a test matrix consisting of the $n-k$ columns of B and the $2k-n$ generating columns (see Loureiro et

al section 4.1) and using the nonsingular matrix as matrix C (see Rijmen et al page 5).

The modified Rijmen et al and Loureiro et al method fails to disclose this process being done iteratively and checking whether the test matrix is nonsingular, and repeating until a nonsingular test matrix has been found.

However, FOLDOC discloses a method of brute force to find something (see page 1).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use FOLDOC's method of brute force to find the nonsingular matrix of the modified Rijmen et al and Loureiro et al method.

Motivation to do so would have been to be able to find every solution (see FOLDOC page 1).

As per claim 5, the modified Rijmen et al, Loureiro et al and FOLDOC method discloses the step of determining the two permutation matrices P_1 and P_2 includes iteratively generating the matrices in a random manner (see Loureiro et al section 4.1).

9.   Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over the modified Rijmen et al and Loureiro et al method as applied to claim 1 above, and further in view of Isaka et al and Williams.

As per claim 6, the modified Rijmen et al and Loureiro et al method fails to disclose the cipher includes a round function operating on 32-bit blocks and wherein the step of generating a [n,k,d] error-correcting code includes: generating a binary extended Bose-Chaudhuri-Hocquenghem (XRCH) [64,36,12] code;

However, Isaka et al teaches such an XRCH code (see page 3).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Isaka et al's XRCH code as the error-correcting code of the modified Rijmen et al and Loureiro et al method.

Motivation to do so would have been that these codes achieve unequal error protection (see Isaka et al abstract page 1).

The modified Rijmen et al, Loureiro et al, and Isaka et al method fails to disclose shortening this code to a [60,32,12] shortened XRCH code by deleting four rows.

However, Williams discloses shortening error-correcting codes (see page 38).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use Williams' method of shortening error-correcting codes to shorten the codes of the modified Rijmen et al, Loureiro et al, and Isaka et al method.

Motivation to do so would have been that shortening codes

enhances flexibility (see Williams page 38).

Response to Arguments

10.   Applicant's arguments filed 04/21/2005 have been fully

considered but they are not persuasive. Applicant argues: Rijmen

doesn't teach the specific generator matrix; there is no

motivation to combine Rijmen with Loureiro because they are

unrelated; the combination of Rijmen and Loureiro would not

produce output with the correct properties for the Rijmen

cipher; and neither Loureiro or Rijmen teach extending the

matrix by $2k-n$ columns to create a nonsingular matrix.

Regarding Applicant's argument that Rijmen doesn't teach

the specific generator matrix as in claim 1, Applicant is

directed to page 4 second to last paragraph.

Regarding Applicant's argument that there is no motivation

to combine Rijmen with Loureiro because they are unrelated, the

motivation to take Loureiro's teaching of extending and

transforming a matrix would have been to hide a function

represented on a matrix format as shown in the first paragraph

of section 4. Loureiro and Rijmen are related because they both

disclose methods for hiding data.

Regarding Applicant's argument that the combination of Rijmen and Loureiro would not produce output with the correct properties for the Rijmen cipher, the Examiner only relies on Loureiro's teaching of extending a matrix as a way to obtain Rijmen's matrix C on page 5.

Regarding Applicant's argument that neither Loureiro nor Rijmen teach extending the matrix by $2k-n$ columns to create a nonsingular matrix, Rijmen's generator matrix of $\mathbf{G}=(I_k \| B)$, with $B \in Z_2^{kx(n-k)}$ is then converted by extending the matrix by means of Loureiro to obtain matrix C on page 5 of Rijmen. In order to change from $\mathbf{G}=(I_k \| B)$, with $B \in Z_2^{kx(n-k)}$ to $\mathbf{G}=(I_k \| B)$, with $B \in Z_2^{nxn}$ the original matrix must be extended by $2k-n$.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Adams et al (US 6363485 B1) and Molva et al (EP 1065593 A1) disclose encryption based on a generator matrix.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Pyzocha whose telephone number is (571) 272-3875. The examiner

can normally be reached on 7:00am - 4:30pm first Fridays of the bi-week off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on (571) 272-3868. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANDREW CALDWELL
SUPERVISORY PATENT EXAMINER

MJP